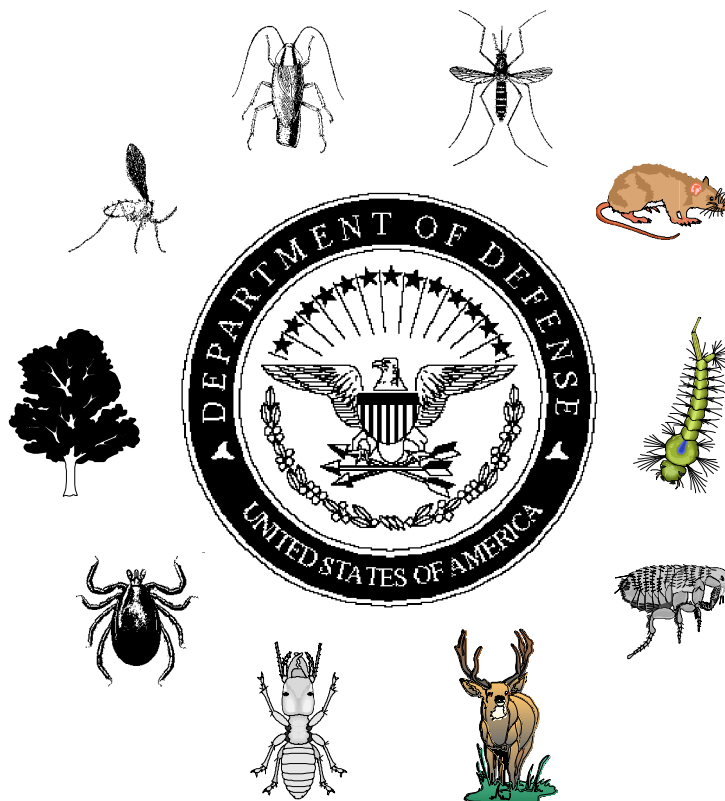


ARMED FORCES PEST MANAGEMENT BOARD

TECHNICAL INFORMATION BULLETIN

DEFENSE PEST MANAGEMENT INFORMATION ANALYSIS CENTER



JAN-FEB 1996

DEFENSE PEST MANAGEMENT INFORMATION ANALYSIS CENTER
ARMED FORCES PEST MANAGEMENT BOARD
FOREST GLEN SECTION, WALTER REED ARMY MEDICAL CENTER
WASHINGTON, DC 20307-5001

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ANNOUNCEMENTS

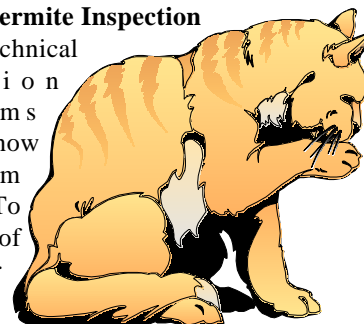
AFPMB/DPMIAC Activities

- **DoD Plan for the Certification of Pesticide Applicators** - Final informal coordination with the AFPMB Council will be complete in March. The Components' comments are being incorporated into a final draft. - MAJ Cannon, AFPMB.
- **Measures of Merit (MOM)** - The Components have provided data for one measure of merit (pounds of pesticides used in the base year FY1993). All the Components, except the Army, have provided data for all three MOMs for FY1994. Letters to the Components clarifying the data requirements for these MOMs and asking for the FY95 data were signed out by Ms. Goodman last November. The suspense date for the FY95 data is March 20. - CAPT Bolton, AFPMB.
- **Pesticide Use/Risk Reduction Partnership with the Environmental Protection Agency (EPA)** - The EPA wants to include our pesticide-use reduction initiative in their new Pesticide Environmental Stewardship Program (PESP). We worked with the EPA to develop a Memorandum of Understanding (MOU) that formalizes our participation in PESP. This MOU was signed by Ms. Goodman and by Dr. Goldman, the Assistant EPA Administrator. We are still waiting to hear from the EPA on whether they would also like to participate in a ceremonial signing. We recently received guidelines from the EPA on requesting proposals for IPM demonstration projects. These guidelines were forwarded to the Components with a submission suspense date of early March. - Col(Sel) McKenna, AFPMB.
- **1996 Research Review Update** - This year's review of pest management research of interest to the DoD occurred from January 23-25 in Gainesville, FL. Attendees from the AFPMB staff were CAPT Bolton, Maj Carpenter and Dr. Robbins. Speakers included representatives from the U.S. Department of Agriculture, the Canadian National Defence Pest Management Advisory Committee, and the Centers for Disease Control and Prevention. There were 62 participants. Revised DoD recommendations for pest management



research will be prepared for Council approval in March from inputs gathered at this review. - Maj Carpenter, AFPMB.

- **DoD Manual on Pest Management Training (DoD 4150.7-M)** - A second group meeting was held in Norfolk, VA, January 30 - February 1, to prepare the final draft of this manual. - MAJ Cannon, AFPMB.
- **Memorandum of Understanding (MOU) on Biological and Toxicological Testing of Pesticides between the DoD and the U.S. Department of Agriculture(USDA)** - This MOU, which coordinates efforts between the DoD and the USDA on insect repellent development, has been signed by Ms. Goodman, The Army Surgeon General and the Navy Surgeon General. We are still waiting for final coordination with the USDA. - COL Driggers, AFPMB.
- **Pest and Vector Control in Bosnia** - MAJ Cannon, the Contingency Liaison Officer, has been working directly with deployed preventive medicine personnel to solve pest and vector control problems in Bosnia. Issues discussed have included mass delousing, Hantavirus surveillance, rodent control, and monitoring of pest control contracts. He has coordinated his efforts with the Joint Staff, Headquarters, European Command, the Army's 30th Medical Brigade, and the Army Center for Health Promotion and Preventive Medicine. - MAJ Cannon, AFPMB.
- **Feral Cat and Termite Inspection TIMs** - New Technical Information Memorandums (TIM) are now available from DPMIAC. To obtain a copy of *Guidelines for Reducing*



Feral/Stray Cat Populations on Military Installations in the United States or *Termite Inspection Recommendations*, mark the last page of the TIB and return it to DPMIAC. - DPMIAC.

- **Multinational Exercise** - Col(Sel) McKenna was asked to participate as a pesticides "reviewer/expert" in a multinational exercise to support NATO's Long Term Scientific Study-44. This exercise was held at the Institute for Defense Analyses in Alexandria, VA, from February 5-8. - Col(Sel) McKenna, AFPMB.

DoD Pest Management Professionals e-mail Addresses Requested - With the increased use of the internet and electronic mail (e-mail) in the DoD, it is important that current addresses be on file. If you have a new or updated e-mail address, please send it to Capt(Sel) Forcum for inclusion in our directory. His e-mail address is: forcumch@acq.osd.mil

U. S. Department of Agriculture (USDA) Research Grants - A limited number of competitive research grants are available from the Secretary of Agriculture. Grants supporting research projects that further USDA programs may be made for a period not to exceed five years. Colleges, universities, individuals, federal agencies, private organizations, state agricultural experiment stations, or other research institutions or organizations are eligible to apply. Proposals will not be accepted from scientists at organizations outside the United States.



For a 1996 program description and application kit, contact the National Research Initiative Competitive Grants Program, Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, Rm. 323, Aerospace Center, AG Box 2241, Washington, DC 20250-2241, Tel: (202) 401-5022, e-mail nricgp@reeusda.gov

USDA, Agricultural Research Service (ARS) Associate Administrator Appointed - Dr. Robert J. Reginato has been named the associate administrator of USDA, ARS, effective February 5, 1996. He has served

as director of the Pacific West Area since 1991. He began his USDA, ARS career in 1959 as a soil scientist at the Water Conservation Laboratory in Phoenix, Arizona. He was research leader of that lab's soil-plant-atmosphere systems research unit from 1980 to 1989. ---- ARS News Notes, 24 NOV 1995

INTEGRATED PEST MANAGEMENT

USDA Launches High-Tech Grasshopper Control - Federal researchers armed with computers and other modern technology are taking on the lowly grasshopper, a ravenous pest that can devastate farm crops. The nation's last major plague of grasshoppers, between 1984 and 1987, infested an area the size of Kansas. The insects devoured wheat and grasses over 55 million acres and forced farmers in 17 Western states to buy feed for cattle and sheep.

The USDA, which fears that the next widespread outbreak could come next summer, has wrapped up a seven-year project of integrated pest management. USDA scientists say the project offers farmers and other land managers a variety of tools to help predict and manage grasshopper outbreaks. Options include environmentally sensitive methods of control, technologies for tracking the number and life cycles of the insects, and an easy-to-use "Hopper" computer program that helps select the most economical control plan.

George Simmons, a rancher whose spread is northwest of Klamath Falls, OR, has had to contend with infestations the last four years. "I had one field of 240 acres that the grasshoppers wiped out in a week", he told the USDA publication *Agricultural Research*. The USDA, responsible for coordinating large-scale pest control across federal, state and private lands, sprayed 11,200 acres, including Simmons' ranch, with malathion in July 1993. The grasshoppers were back 10 days later. Simmons spent \$9,000 to replace grass devoured by the grasshoppers that year, and he lost about \$40 per head when he had to sell his calves early at a lower weight.

Jerome A. Onsager, an entomologist with the USDA, Agricultural Research Service (ARS), said researchers found they could dramatically reduce infestations by concentrating on egg beds, since clear-winged grasshoppers usually lay eggs in a few small areas. Using a lure of wheat bran laced with a small amount of carbaryl, the USDA tested this idea at the Rangeland Insect Laboratory in Bozeman, Mont., last year. A 2,000-acre "hot spot" on private land nearby was sprayed with malathion. "These tactics kept the grasshoppers in check and reduced our overall chemical use by 95 percent", said Gary G. Smith of the USDA,

Animal and Plant Health Inspection Service, in Oregon.

Scientists are developing two new control chemicals. One would regulate the growth of the hungry insects. The other would markedly reduce the required concentrations of malathion. Another technique under study would infect grasshoppers with a naturally occurring protozoan spread through the insects' feces. "Our early tests indicate that this pathogen could be very deadly to these grasshoppers", said Douglas A. Strett, a USDA, ARS entomologist. "Grasshoppers don't simply eat grass. They are omnivores, and many eat feces and even each other." Scientists are using computers to predict hatching of several grasshopper species, so the pests can be annihilated at just the right stage of development.

Using satellite technology, computers will soon be able to prepare maps to pinpoint the number of grasshoppers throughout the West, permitting farmers to begin retaliating within hours of finding an infestation.

--- Ken Olds/Pesticide Hotline, 1 JAN 1996.

PESTICIDES & EQUIPMENT

The Environmental Protection Agency (EPA) Calls for Partners in Pesticide Environmental Stewardship

The University of Arizona Pesticide Coordinator's Office recently published an excellent overview of the Pesticide Environmental Stewardship Program. The following extracts quote extensively from this source.



In the 1990s, people have come to realize that exercising environmental stewardship by taking responsibility for safeguarding human and environmental resources is essential to sustain or improve the quality of life for ourselves and for future generations. All of us have a stake in developing the knowledge, technology, and commitment needed to carry out environmental programs that are responsible, innovative, flexible, and effective.

Most of us recognize that we benefit from pesticides, but we also know that some pesticides present risks. The EPA, in concert with the U.S. Department of Agriculture (USDA) and the U.S. Food and Drug Administration (FDA), maintains a strong program to regulate the production and use of pesticides. As stakeholders, however, we must all become partners

in reducing the risks from pesticides to a minimum.

The Pesticide Environmental Stewardship Program is a broad effort by the EPA, the USDA, and the FDA to reduce pesticide use and risk in both agricultural and nonagricultural settings. In September 1993, the three agencies announced a Federal commitment to two major goals:

- Developing specific use/risk reduction strategies that include reliance on biological pesticides and other approaches to pest control that are thought to be safer than traditional chemical methods.
- By the year 2000, having 75% of U.S. agricultural acreage adopt integrated pest management programs.

A key part of the Pesticide Environmental Stewardship Program is the public and private partnership. When the EPA, the USDA, and the FDA announced the partnership in December 1994, more than 20 private organizations signed on as charter members.

Joining the partnership gives organizations opportunities to demonstrate a commitment to environmental stewardship and take steps to put this commitment into practice. Membership may well enhance public perception of organization, constituent support, and employee morale. In addition, membership offers access to the following benefits:

- By joining, each Partner or Supporter is assigned a liaison who serves as that organization's official contact with the EPA. The liaison can help obtain information not only about the partnership, but about other EPA programs, policies, and procedures. Further, your contact can help express the organization's concerns to the EPA management and ensure that these views are considered as the agency develops pesticide regulations and makes decisions on agricultural policies.
- As funds allow, the EPA and the USDA provide Partners with seed money to help support pest management practices that reduce pesticide use and risk. In addition, Partners participate in the identification of needs for research on alternative systems for pest management, as provided for in the August 1994 Memorandum of Understanding between the EPA and the USDA.

- The Pesticide Environmental Stewardship Program will publicly recognize Partners and Supporters that demonstrate their commitment to environmental stewardship and achieve progress in reducing pesticide use and risk while managing pests cost-effectively.

---- EPA Publication No.730-F-95-002 of September 1995; in ACCES--Pesticides, 20(12): 2, DEC 1995.

AFPMB Note: The Department of Defense became a partner in the Pesticide Environmental Stewardship Program in November 1995.

Methyl Bromide Persistence Reevaluated



A new study suggests that methyl bromide may survive in the atmosphere for less time than previously thought and therefore poses less of a threat to the ozone layer. The study adds to evidence that certain soil bacteria destroy atmospheric methyl bromide at a faster rate than once believed, reducing its estimated atmospheric lifetime to a little more than nine months. This is about two-thirds as long as current estimates. These findings were reported by Joanne H. Shorter and colleagues in the October 26, 1995, issue of *Nature*.

Methyl bromide is discharged into the air by marine plants and by burning biomass or leaded gasoline; it is also released when used as a fumigant to control insects and other pests. Once it reaches the stratosphere, sunlight breaks it down, releasing bromine atoms that destroy the stratospheric ozone that protects the earth from harmful ultraviolet radiation. Because of methyl bromide's role in ozone depletion, amendments to the international ozone-protection treaty, the Montreal Protocol, froze methyl bromide production at 1991 levels. The 1990 Clean Air Act amendments require US companies to phase out production by 2001.

The new findings reduce methyl bromide's ozone depletion potential by roughly 30 percent, according to the report. That rate of depletion is still high enough to bring it within the scope of regulation by the Montreal Protocol and the Clean Air Act. The destruction of methyl bromide by soil alters some calculations of its global atmospheric abundance, according to a National Oceanic and Atmospheric Administration scientist. Previously, global estimates of the emission and absorption of methyl bromide were consistent with measured atmospheric concentrations,

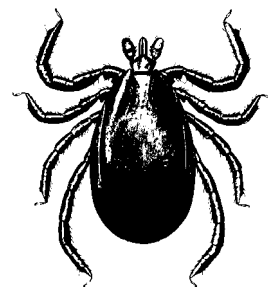
but the additional absorption by soil upsets that balance. However, researchers emphasize that the new data are preliminary and were extrapolated from results obtained by using soil samples to calculate global averages of how much methyl bromide the soil absorbs.

The researchers lab- and field-tested different types of soil from four sites in the United States, Costa Rica, and Canada. The research was funded by the Methyl Bromide Global Coalition, a group of agricultural and chemical companies. All the surface soils consumed the chemical within minutes; forest soils in the temperate zone acted most rapidly. By applying antibiotics and fungicides to the soil samples, the researchers concluded that bacteria, not fungi or chemical processes, consumed methyl bromide.

Other researchers, tracking the depletion rates of large quantities of methyl bromide applied to fields by farmers, found that soil breaks the chemical down slowly. The new research demonstrates that breakdown under these conditions is slower because the fumigant kills the bacteria that would normally eat it. Shorter and her colleagues studied lower concentrations of methyl bromide, much closer to typical atmospheric values. ---- Science News, Vol. 148, 28 OCT 1995.

Two Least-Toxic Materials Tested for Control of Lyme Ticks

- Applications of residual insecticides are effective in reducing nymphal tick populations on residential properties and in wooded habitats in Lyme disease endemic areas. However, while providing effective tick control, such products may be hazardous to humans and the environment.



With these risks in mind, homeowners may elect to use least-toxic pest control products (Category III and IV pesticides) to control ticks professionally or by themselves. These products are available through garden shops and catalogs for controlling ornamental, garden, and household pests. The authors of a recent study tested several of these least-toxic pest control products against immature *Ixodes scapularis* ticks and found Drione[®] desiccant and Safer's[®] insecticidal soap, both of which contain pyrethrin, to be most effective.

The silica gel-based desiccant Drione[®] (with 1% pyrethrin) and Safer's[®] insecticidal soap (with 0.2% pyrethrin), formulated with and without isopropyl alcohol (ROH), were field tested against nymphal and adult populations of *I. scapularis* in a hyperendemic woodlot in Westchester County, NY. Drione[®], insecticidal soap, and insecticidal soap with ROH

provided equivalent levels of control for nymphs and adults. Compared with untreated plots, nymphal populations were significantly reduced one week (93.3-100%) and two weeks (66.4-85.7%) following treatment, and adult populations were significantly reduced one week (53.5-62.9%) following treatment. Factors possibly contributing to the moderate and shorter period of adult control are discussed in the article. Drione^R and insecticidal soap were shown to be effective alternatives to residual insecticides and could be an important component of an integrated tick management program on residential properties in areas where Lyme disease is endemic. Both products lack residual activity and would require repeated applications to maintain sufficient levels of control throughout the tick season. Ecotone habitat consisting of non-ornamental, unmaintained edge adjacent to woodlots and wooded corridors on residential properties would most likely be suitable for such treatments. Additional field tests are required to determine the efficacy of Drione^R and insecticidal soap treatments in lawn and ornamental habitats. --- Journal of Medical Entomology 32(6): 859-863, 1995.

MEDICAL ENTOMOLOGY

Epidemiology of Tickborne Encephalitis: A Synopsis

- Tickborne encephalitis (TBE), which goes by many other English names (e.g., biphasic meningoencephalitis, Central European encephalitis, diphaseic milk fever, Far Eastern encephalitis, Russian spring-summer encephalitis, spring-summer meningoencephalitis, taiga encephalitis), is a complex of some 70 different flaviviruses that attack the central nervous system and cause significant morbidity and mortality in humans. The disease is known from Austria, Bulgaria, Czechoslovakia, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Norway, Poland, Romania, Sweden, Switzerland, Turkey, the former Soviet Union, and the former Republic of Yugoslavia (FRY). Virologists recognize two major subtypes of TBE: eastern and western. The eastern subtype occurs in Asiatic Russia and is especially virulent, with case-fatality rates of 30-38% in endemic areas; to date, it has not been identified in the FRY. The western subtype is found over much of Europe, including European Russia and the FRY, and produces a less severe disease, with case-fatality rates of 1-2%.

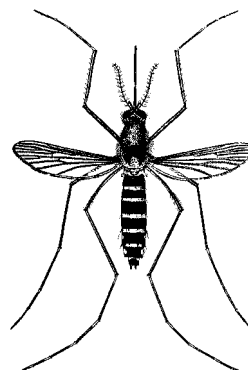
In Central Europe, the FRY and European Russia, the principal vectors of western TBE are *Ixodes ricinus* (the so-called castor bean or sheep tick) and *I. trianguliceps*, which are also viral reservoirs (i.e., females pass the virus transovarially to their progeny). *Ixodes persulcatus* is the chief vector in Asiatic Russia. Vertebrate reservoirs include small mammals (rodents

and insectivores), sheep and birds. Large populations of *I. ricinus* are associated with deciduous forest edges and scrub terrain, where dense undergrowth provides shelter for small mammals. In Central Europe, populations of *I. ricinus* usually peak during the mild, moist months of late spring (May-June) and late summer (September-October).

TBE virus is transmitted to humans by the bite of infected ticks in any active stage (larva, nymph, adult), though most victims cannot recall having been bitten. The virus may also be contracted by consuming unpasteurized dairy products from infected cows, sheep or goats. Cases usually occur from April to October, but 95% are reported between May and September and fully one third of all cases occur in July. In general, foresters, farmers, herdsmen and others working in scrub or wooded areas have a threefold higher risk of becoming infected than those in other occupations. As a consequence, most victims are males between 20 and 40 years of age.

In the FRY, some risk of TBE infection exists countrywide, but the incidence is much higher in the northwest, especially in endemic foci in northern Slovenia and Croatia. Indeed, Slovenia has remained the largest source of TBE cases since the disease was first recognized in the FRY in 1946. Very few cases have been reported along the Adriatic coast or elsewhere. The focalty of this disease is such that, even in Slovenia, human antibody prevalences approach zero in nonendemic areas. Thus, the risk to humans in such states as Bosnia and Herzegovina, Macedonia, and Serbia and Montenegro is considered to be quite low. Throughout the FRY, the primary intervention to prevent TBE in U.S. forces should be strict adherence to personal protective measures, including application of DEET tick repellent to skin, impregnation of uniforms with Permethrin, and appropriate wearing of the uniform (tuck trousers into boots, wear sleeves lowered). A prophylactic vaccine, manufactured in Austria, is available but can only be administered voluntarily and under an Investigational New Drug protocol.---

"Tickborne Encephalitis: Epidemiology in the Former Yugoslavia and Vaccines," Memorandum from Headquarters, U.S. Army Medical Command, ATTN: MCHO-CL-W, Fort Sam Houston, TX 78234-6000, 29 JAN 1996.



A Look Ahead to Mosquito Control Programs in The Year 2000 - A thought-

provoking hypothetical projection of what the future has in store for mosquito control published in the Fall 1995 *Wing Beats* is of value to those interested in where mosquito control is headed, as well as arthropod vector control in general. The article provides a lot of information that can assist in planning the future direction of military entomology. Among the projections the author makes are:

- The skills needed to effectively operate mosquito control programs will continue to grow. Many programs will be led by biologists and entomologists with an M.B.A. instead of M.S. or Ph.D. degrees.

- Training of employees will continue to encompass more than just pesticide handling, mosquito biology and calibration. Much of the training will be accomplished using video tapes.

- New skills will be more diverse: wildlife, wetlands, fisheries, marine sciences, civil engineering, hydrology and medical technologies will be among the diverse fields involved in mosquito control.

- The ability to work with the press and local governments will be part of the public education process. A manager skilled at public relations and directing a service-oriented program will have fewer problems at budget time.

- Equipment needs will continue to change. Vehicles will be fewer and more versatile. Trucks once used for a single purpose will become multirole vehicles.

- Aircraft will become more versatile and fewer in number. Instead of large broadcast treatments, smaller, more modern twin-engine planes and light turbine-engine helicopters will become the norm.

- Contracting between mosquito control programs on a regional basis will be more common due to specialized equipment and expensive operations (rotary ditching, aerial larviciding and adulticiding). Increased cooperation between programs will provide small programs with more options during disease outbreaks or severe pest infestation periods.

- The biggest advances will be in electronic equipment. Every professional will have a computer workstation on his or her desk. More user-friendly software for integrating spreadsheets, graphics, word processing and data management will allow everyone to process more data. These workstations will also integrate video, geographic information systems (GIS),

weather data (local radar, remote stations and satellites) and field data recorders. Programmed field data recorder and global positioning systems (GPS) navigational equipment will appear in all aircraft and, slowly, in other vehicles. Paperwork in the field will cease as electronics take over.

- Controlling mosquitoes will not cease. Chemicals and application techniques will be fine-tuned. New materials will be integrated into programs to fill gaps left by inefficient or environmentally insensitive materials.

- Insecticide resistance will become a high technology fight utilizing genetic techniques and rotated chemicals. Resistance will become so well understood that there will be recommended programs for detecting and controlling tolerant mosquitoes.

- The use of attractants will become standard procedure to maximize control efforts. Baits to kill, sterilize, or confuse emerging adults will become commonplace. Adulticiding will be greatly reduced due to environmental pressures and increased emphasis on alternative means. Larviciding will decrease with the advent of residual biologicals that really work.

- Biological control will emerge in the coming century. The great advances in genetic engineering will enable scientists to create superior biological control agents. These biologicals will be cheap, persistent and ecologically sound. Ideal for Third World countries, they also will be heavily utilized in programs in the States. This technology will lead to a large number of very small programs where none existed previously.

- Source reduction will become more prominent in many parts of the country. The exception will be vast tracts of public lands. Lands like the Everglades will never see anything except limited chemical and biological control. Source reduction will take many forms. Open marsh water management will continue to develop where it can be used. Impoundments will have diverse management plans for many uses. Fisheries, aquaculture, endangered species, waterfowl, stormwater management, and mosquito control will all be competing interests. Mosquito prevention in stormwater management facilities will become universal.

- Federal, state, and local regulations, created with input from mosquito control programs, will become part of the solution and not part of the problem. In addition, most programs will have local ordinances prohibiting the domestic production of mosquitoes. The introduction and spread of *Aedes albopictus* throughout the country has turned domestic production into a much

more serious problem. Citations and court visits will accompany the new regulations.

- Surveillance information coupled with GIS will enable control personnel to integrate locations, adult mosquito populations, service requests, immature habitats, soils, vegetation, human population, roads and environmentally sensitive areas. This will allow more targeted treatments, better data analysis, better mapping and more efficient surveillance coverage. Data analysis by space and time will be of tremendous benefit. Surveillance will be more a matter of coverage than technique. Integration of suitable techniques for different species in different areas will provide the highest quality information. Basic statistics to determine significant increases and decreases of populations will be widely used.

- A synthetic bait mimicking human attractiveness and coupled with suction traps will become the standard tool for surveillance. Most programs will simply remove the lights from New Jersey and CDC light traps and continue to utilize these forms with the new bait.

- Disease surveillance will incorporate innovations but will be accompanied by a discouraging lack of progress in other areas. Techniques to detect antibodies and antigens in blood and in mosquitoes will be available to mosquito control programs. These tests will be simple, inexpensive, and will use basic facilities available to any program. Such advances will lead to tailor-made disease surveillance and will insure the viability of small research programs.

- A large problem will be the increased number of diseases associated with wild animal importation and human migration. The arrival of human filariasis will be a small problem only due because human cases will be rapidly diagnosed and treated.

- Mosquito control programs will continue to be involved in related activities, such as drainage, weed control, tick control, other pest control, environmental monitoring, endangered species management, and wetlands creation and rehabilitation. ---- Wing Beats, Fall 1995.

AFPMB Note: Some of these may be useful to keep in mind as we consider the final Research Recommendations for the U. S. Department of Agriculture in coming months.

Dual Infection of *Ixodes ricinus* Nymphs with Lyme

Disease Bacteria - Data from European studies indicate that, in humans, particular *Borrelia burgdorferi* genospecies may be associated with specific clinical manifestations of Lyme disease: infections by *B. burgdorferi sensu stricto* tend to lead to arthritic symptoms; infections by *B. garinii* appear to cause neurologic complications; and late cutaneous manifestations (acrodermatitis) appear to be associated with *B. afzelii*. Mixed clinical manifestations have also been described. Recently, polymerase chain reaction (PCR) tests showed that DNA from more than one of the three *Borrelia* species associated with Lyme disease in Europe was present in the biological fluids of some Lyme disease patients, raising questions concerning the consequences of a bite by a multiply infected tick, the clinical significance of human infection caused by more than one species of *Borrelia*, and the origin of these multiple infections. This last point begs a question: do multiple infections result from successive bites by two or more infected ticks or from a single bite by a tick infected with more than one *Borrelia* species?

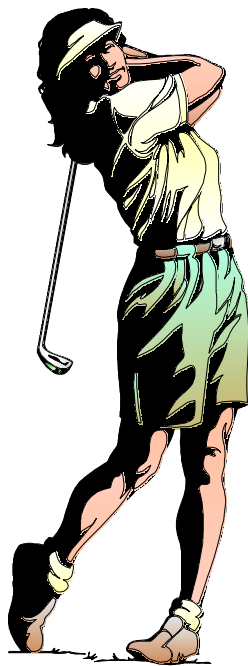
To investigate whether ticks are infected by different species of the *B. burgdorferi* complex at the same time, a survey of the vector *Ixodes ricinus* was carried out during the spring of 1994 in Rambouillet Forest near Paris. A total of 249 unfed nymphs collected from vegetation were analyzed by PCR to distinguish the three Lyme disease-associated *B. burgdorferi sensu lato* species, i.e., *B. burgdorferi sensu stricto*, *B. garinii*, and *B. afzelii*. Thirty of the 249 nymphs were positive for *B. burgdorferi* when SL universal primers were used. Further testing of five of the 30 nymphs by PCR did not confirm the preliminary results with the universal primers, possibly because of the genotypic variability of *B. burgdorferi sensu lato* or the existence of other distinct subgroups or genomic species included in *B. burgdorferi sensu lato*. Of the 25 remaining nymphs, 19 were infected by a single species of *Borrelia* (four by *B. garinii*, 15 by *B. afzelii*) and six were infected by more than one (two by *B. burgdorferi sensu stricto* and *B. garinii*, three by *B. garinii* and *B. afzelii*, and one by *B. burgdorferi sensu stricto* and *B. afzelii*).

From these results, it appears that when nymphs are infected with one species, *B. afzelii* is the most common. This species may have been prevalent in the study area or may have a greater tropism for vertebrate dermal tissue and/or the peripheral circulatory system than the other two species. The simultaneous presence of more than one genospecies in unfed nymphs of *I. ricinus* was not exceptional (24%), and all combinations of two species were observed. The association of three genospecies was not detected. There are four possible explanations for simultaneous infections in unfed

nymphs: (1) larvae may have fed on a host infected by more than one *Borrelia* species (recently, *Apodemus speciosus* field mice infected by two different species have been found), (2) larvae may have fed on more than one infectious host (i.e., larval feeding may have been interrupted), (3) transovarially infected larvae may have fed on an infectious host, and (4) transovarial infections may themselves have been mixed. --- Emerging Infectious Diseases, 1(3), JUL-SEP, 1995.

NATURAL RESOURCES

Environmentally Friendly Geese Control - Geese



stories on golf courses are as numerous as tips about putting techniques. Geese think of greens as lunch and water hazards as bathtubs. Some courses have literally thousands of the huge, territorial waterfowl. Their droppings turn the greens into muck and clog up mowers. Superintendents have tried chasing them with utility vehicles, draping rope across ponds, and scaring them with a variety of noisemakers from fireworks to cannons -- and even shotguns in more remote locales. None of those solutions is popular with the neighbors or the golfers. But fittingly from the hills of Scotland, whence golf came, comes an environmentally

safe solution which has become immensely popular -- trained Border collies. Known worldwide for their superb herding abilities, these dogs are being used to make the goose vamoose.

Border collies have been bred for their herding abilities and intelligence for hundreds of years. Properly trained, they can move geese to the rough, keep them in the pond or scuttle them off to adjacent property. "If the dog is taught that the pond is the geese's pasture, then he will put them there. If he's taught that the swampy area of the rough is where they belong, he puts them there," says one prominent breeder. "To him, they're his livestock and you are his shepherd. You say, 'That'll do,' and that tells him the geese are where you want them." The collies have been known to move geese even in locations where nothing else has worked. Unlike noise makers and other mechanical

means, the dogs remind geese of a natural enemy. "To the geese, he is a fox. He is a predator. If the dog comes out twice a day, their little goose minds record two foxes. Three times a day, three foxes. It doesn't take much to persuade the geese that this is just not a good place to settle and raise a family." Trained Border collies use their eyes and feet to herd their quarry. The dog runs to position itself in front of the animals, and then it gives them a look known as "the eye." Rather than face the dog's gaze, the stock -- be it sheep, cattle or geese -- turn away. The eye is the tool the Border collie uses to intimidate stock into directional movement. The dogs use "the eye" on geese to herd them and keep them moving until they leave the area. Border collies do not bite or catch geese. In most cases, the birds fly off long before the dog gets that close. In any case, the Border collie's natural instinct is to herd, not harm, and it will only nip a goose in self-defense. Some sheep herders' Border collies are even taught to hold the leg of a lamb gently in their teeth until the shepherd arrives to give it medical treatment or a vaccination.

The goose-herding process on a golf course must be controlled by the handler whether that is the superintendent or an assistant. Border collies respond to simple verbal and hand commands. The dogs can learn a variety of words and phrases, enabling the handler to command them to jump into a golf car or get in a kennel, as well as herd geese. Trainers and superintendents report that these collies can learn to do practically anything. Border collies need to work to be happy. One breeder warns how important work is to their temperaments. "Most Border collies are obsessed with their herding nature," she says. "They need exercise, a focus, a goal. If you just put your Border collie in your apartment and leave it alone, you will have a very unhappy dog." Another breeder cautions that Border collies "will find something to do if you don't give them something to do." Tales abound of the dogs getting into all kinds of mischief, including pushing all the house plants in a home into the center of one room, operating an automatic golf ball dispenser, and leaping a kennel fence to join in a children's camp-out. "You don't want to leave these dogs loose," agrees a breeder and owner. "They're not yard dogs, they're working dogs. They try to get in front of anything to herd it, whether it is a cat or a goose."

Praise of Border collies abounds. "There's just no comparing Duke [a Border collie] to the things I've tried over the years. Everything they told us has worked better than we imagined it would. This by far exceeded our expectations," says one gold course superintendent. "We had 650 geese a day before, now we have no geese at all. Some will try to come in, but not for long..." One golf course also has ducks that the membership

enjoys. Border collies can be trained to leave them alone. From a public relations point of view, the Border collie is described as "worth every penny."

This information was extracted from an article that also includes a list of breeders and trainers and sources for more information on trained Border collies. ---- Golf Course Management, OCT 1995.

TIB BYTES

Centers for Disease Control and Prevention's (CDC) Morbidity and Mortality Weekly Report (MMWR) Accessible on the World Wide Web (WWW) - To access the MMWR via the MMWR web page, web to: **<http://www.cdc.gov/>** and go to: "Publications, Products, and Subscription Services," then "Morbidity and Mortality Weekly Report (MMWR)" to find the MMWR. The MMWR is also accessible via anonymous file transfer protocol (FTP) at: **<ftp.cdc.gov>** in directory: **[pub/Publications/mmwr/wk/](ftp://ftp.cdc.gov/pub/Publications/mmwr/wk/)**

If you do not have access to either FTP or the WWW, you may retrieve the MMWR via e-mail from the Majordomo list server. This process is much slower and more complex than either anonymous FTP or the WWW. Copy the following script, and paste it into an e-mail message addressed to **lists@list.cdc.gov**: **get mmwr mmwr.archive.951201**. Majordomo will send the file uu-encoded. Depending on your e-mail system, some sites may have to process the received mail with a uu-decode utility to create an acceptable binary file readable by Acrobat. If the e-mail system does not have uu-decode, contact your e-mail administrator. Uu-decode software is available free of charge at many FTP sites on the Internet.

If you need further instructions about Majordomo send an e-mail message to: **lists@list.cdc.gov** The subject line should remain blank, and the body of the message should read: help. Majordomo will send you a detailed help file with further instructions and commands.

A searchable index is now available for issues of the MMWR dating from 1993 to the present. Via the WWW, access: **<http://www.crawford.com/>**

If you have other problems or questions, send e-mail to **mmwr-questions@list.cdc.gov**
Stephen Morse: **morse@rockvax.rockefeller.edu** ---- e-

mail dated 1 DEC 1995 to **promed@usa.healthnet.org**

PAHO Launches Web & Gopher Servers - The Pan American Health Organization (PAHO) has launched its Web Server, containing information on public health and related issues in the Americas. Visit the Web and Gopher servers at:

<http://www.paho.org>

<gopher://gopher.paho.org>

Contact **webmaster@paho.org** for more information.

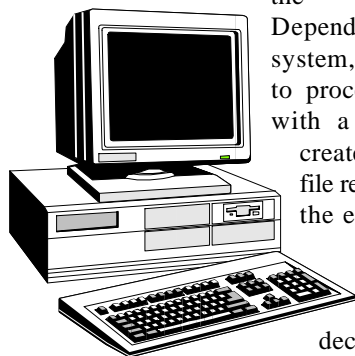
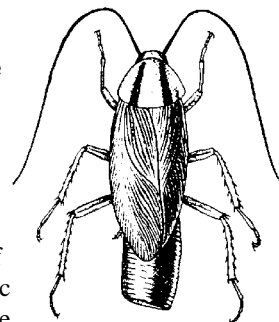
Mr. Eunsik Kwak: **kwakeuns@paho.org**
Pan American Health Organization, Washington, DC, USA ---- e-mail dated 10 NOV 1995.

TIB BITS

Effective Use of the Customer Complaint as a Surveillance Tool - A recent article on the use of complaints as a surveillance tool in a mosquito control agency's program is of importance to military public health, preventive medicine and pest management. The customer complaint is an integral part of a pest management program and can be helpful in reducing pesticide applications.

The first and probably most important use of the complaint is to educate the public about pest control practices and methods as well as what a program encompasses. Use the time spent responding to a complaint to explain the life cycle of the pest and to tell the customer what they can do to help in the control of pest populations without pesticides. A lot of complaints are a direct result of poor maintenance practices in or around the home or business. Examples would be a dirty kitchen, wood piles or old tires around a building, yard mulch, or a boat or other water-retaining item that has become filled with water in someone's backyard. Educating the public about the sources of pests can result in the reduction of breeding habitat or harborage and can greatly reduce the need for pesticides to control pests.

Complaints may also point the way to new or unknown pest breeding habitats. Some breeding areas may have been overlooked by the pest control office or they may be located on private property where an



inspector would be hesitant to explore. These areas might never be located if complaints did not bring them to the attention of the pest control agency. The identified source may be suitable for modification to help reduce harborage. A complaint may also help determine the parameters for future pesticide applications if needed. An example would be a new housing development in an area that previously did not require mosquito control. Many agencies also use complaints to determine when to treat established areas.

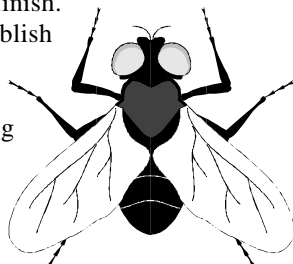
The customer complaint may be used in tandem with or as verification of other surveillance techniques. For example, mosquito landing rate or bite count data can be confirmed or refuted by an increase or decrease in the volume of complaints in an area. Along with its use in verification, the complaint may be employed to determine the effectiveness of a treatment program. An example would be when an agency adulticides an area by either ground fogging or aerospray for mosquito control. The volume of complaints received pre- and post-treatment gives an indication of the success of the treatment over the entire treated area. If calls drop off after treatment, the agency's efforts were probably successful. Conversely, if the number of complaints remains stationary or increases, agency personnel should evaluate the situation to determine why the treatment was ineffective.

Complaints may also be used to justify or reinforce many land use or water management projects. If the residents of an area are continually calling about mosquito problems that are diagnosed as due to poor water management practices, complaints can be used to argue for corrective measures. This information is also a great help when presenting a project for funding. A pest manager's main purpose is to serve the customer and if the funding agency is convinced that a large number of taxpayers are complaining about a problem that can be rectified by physical management, the agency will probably underwrite the costs of control.

Complaints may also be used to support the installation of a dedicated "hot line" for calls. The logged calls can be recorded and counted to classify them for handling, while also helping to monitor the situation.

A survey of 20 mosquito control agencies in New Jersey was conducted to determine how complaints were handled from start to finish.

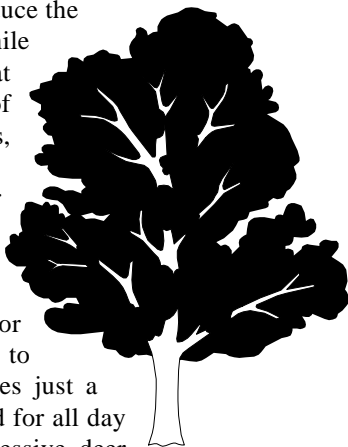
The results were used to establish minimum guidelines for the handling of complaints. The following recommendations are arranged to show how a complaint should be handled.



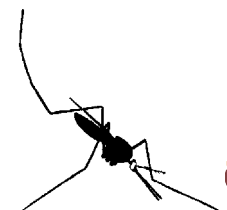
1. Most complaints are received by telephone, so have a well-qualified individual handle all calls. The caller is the reason you are in business and that person deserves to be treated with respect and courtesy. This practice will also help to weed out crank calls. A knowledgeable and personable individual will be able to recognize legitimate complaints and appease chronic complainers.
2. Log all legitimate calls on a preprinted complaint form for follow-up by an inspector or field person.
3. All complaints should be followed up and the response should be as quick as possible.
4. Answer the complaint as close as possible to the time of the day that the complaint specifies. If a customer is complaining about mosquitoes in the afternoon, responding to the complaint in the morning may not provide the information needed to correctly evaluate the situation.
5. Personnel who answer complaints should possess a working knowledge of your control program as well as the life cycle of the various pest species that are present in your agency's area. They must be able to evaluate the situation for adult or larval activity. They must know the correct procedures for taking a landing rate count, bite count, or trap count, and be able to determine larval habitat, whether treatment is required, and what procedures to follow.
6. Investigative personnel should not make recommendations that exceed their level of expertise.
7. Responses to any unanswered questions should be expedited.
8. The individual responding should carry literature that explains how the pests breed and can be controlled.
9. The responding individual should leave a follow-up form if the person who made the complaint is not at home at the time of the investigation.
10. The recommended course of action taken on all complaints should be logged for future reference.

The importance of the complaint as a tool in pest control cannot be denied. A pest manager's public image is chiefly a reflection of his or her response to complaints. ---- AMCA Vector Review, NOV-DEC 1995.

Deer Fly Hatband - George Lourake, a logger from Massachusetts, has devised a simple and effective way to reduce the impact of deer flies while enjoying the great outdoors. Instead of trying to repel the flies, he tries to catch them. The flies usually go for your head first, so George attaches a strip of fly paper to the top of his hat. Using alligator clips or safety pins to attach the paper requires just a few seconds but is good for all day protection against aggressive deer flies. The technique has proved very effective according to everyone who has tried it. Most of the time the flies are not even seen until you take off your hat and check the fly paper. ---- Buzz Words, JAN 96.

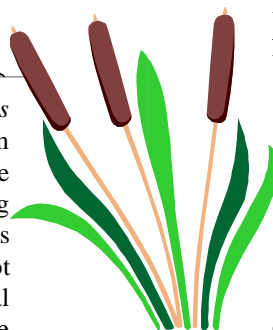


Man in a Bottle - One of the more interesting poster presentations at the Entomological Society of America Meeting in Las Vegas was entitled "Man in a Bottle: Development of Odor Attractants for Africa's Most Important Malaria Vector *Anopheles gambiae*," by G.J. Knols, Ruurd De Jong and Willem Takken of the Agricultural University, Wageningen, the Netherlands. These workers evaluated odor-producing factors in human foot residue, commonly referred to as "Foot Cheese." Comparative chemical analysis of foot cheese showed it to be almost identical to commercial Limburger cheese. The mosquitoes, by the way, were highly attracted to foot cheese when offered unwashed feet versus washed feet. There was no projection of the impact of this research on the Limburger cheese industry or on the prospects of getting humans to wash their feet more often. ---- Dr. Timothy H. Dickens.



and Labor-Intensive Groomed Lawns - A book entitled *The Wild Lawn Handbook: Alternatives to the Traditional Front Lawn*, by Stevie Daniels (Macmillan, 1995, 223 p., color plates, hardcover), should be in every serious environmentalist's library. "If you dare to break away from an ecologically unsound, expensive, and water-hungry lawn landscape, then seek out the grasses and native flowers of your region and begin the transformation," advises the author. After first identifying four types of lawn alternatives -- prairie, meadow, moss, and ground cover -- Ms. Daniels shows how to pick the best solution for a given area. She bases her choices on the ecology of an area, the amount of maintenance required, and other factors, such as the affinity of native plants for garden varieties. The concluding chapter outlines common community ordinances and ways of dealing with opposition to an alternative landscape. Considering the degree of pesticide exposure stemming from herbicides, fungicides, and insecticides applied to lawns around the nation, not to mention the "leisure" time consumed in maintaining such lawns, the potential benefits of this book are well worth the relatively small cost (\$20). Sure, it won't be an easy pitch to base commanders, but if the trend catches on in society at large, it will become acceptable practice everywhere, and who is to say the DoD can't start the ball rolling? The book can be ordered by Visa or MasterCard by calling 1-800-544-4565; or in the Washington, DC area (202) 331-9653. ---- Science News, 148(25): 402, DEC 16, 1995.

Aquatic Plant ID Deck - A 3"x4" card deck of color photographs of 67 aquatic and wetland plant species. Each card has identification information on the back. The cards are alphabetized, with two tables of contents using scientific and common names. Both sets are available for \$8 plus tax and shipping. Ask for Catalog No. SM-50 from IFAS Publications, IFAS Bldg. 664, University of Florida, Gainesville, FL 32611-0001, Tel: (904) 392-1764.



PUBLICATIONS OF INTEREST

Environmentally Friendly Alternatives to Pesticide-

SELECTED MEETINGS

MARCH 18-21. 151st Meeting, Armed Forces Pest Management Board - Washington, DC. COL Don Driggers, AFPMB, Forest Glen Sect., WRAMC, Washington, DC 20307-5001, Tel: (301) 295-7476, Fax: (301) 295-7473, DSN Prefix 295. E-mail:

driggedp@acq.osd.mil

MARCH 22-29. 37th Meeting, Navy Occupational Health and Preventive Medicine Workshop - Virginia Beach, VA. Karen E. Pollok, Navy Environmental Health Center, 2510 Walmer Ave., Norfolk, VA 23513-2617, Tel: (804) 363-5454, DSN Prefix 864, Fax: (804) 444-3672. E-mail: workshop@ehc50.med.navy.mil Internet home page: <http://ehc40.med.navy.mil/-workshop>

MARCH 24-28. American Mosquito Control Association/Mid-Atlantic Mosquito Control Association/Virginia Mosquito Control Association - Norfolk, VA. P.O. Box 5416, Lake Charles, LA 70606, Fax: (318) 478-9434.

JUNE 16-21. VII International Congress on Lyme Borreliosis - San Francisco, CA. Mary Fernandez, P.O. Box 2087, Fort Collins, CO 80522, Tel: (970) 221-6426.

JULY 15-18. 152nd Meeting, Armed Forces Pest Management Board - Washington, DC. COL Don Driggers, AFPMB, Forest Glen Sect., WRAMC, Washington, DC 20307-5001, Tel: (301) 295-7476, Fax: (301) 295-7473, DSN Prefix 295. E-mail: driggedp@acq.osd.mil

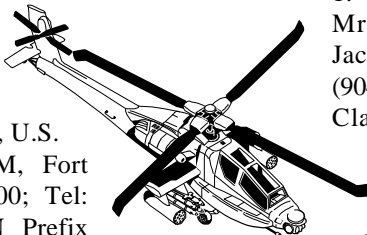
COURSES FOR DoD PEST MANAGEMENT PERSONNEL

If you see any information that needs correcting or updating, please contact Capt(Sel) Forcum, who can be reached at Tel: (301) 295-7479, DSN Prefix 295 or e-mail forcumch@acq.osd.mil

ARMY SPONSORED COURSES

1. For information on the following courses, contact: SFC Kenneth Jones, Academy of Health Sciences, U.S. Army, ATTN: MCCS-HPM, Fort Sam Houston, TX 78234-6100; Tel: (210) 221-5270/4278, DSN Prefix 471. Classes are conducted at Fort Sam Houston, TX.

Pest Management Technology - Core Instruction for Initial Certification:
18-22 MAR 96
6-10 MAY 96
5-9 AUG 96



Plant Pest and Vegetation Management - Initial Certification for Categories 3, 5 & 6:

25-29 MAR 96

13-17 MAY 96

12-16 AUG 96

Arthropod and Vertebrate Pest Management - Initial Certification for Categories 7 & 8:

1-5 APR 96

20-24 MAY 96

19-23 AUG 96

Recertification:

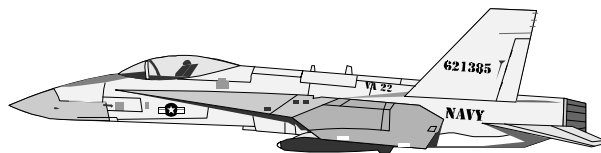
22-26 APR 96

9-13 SEP 96

2. For information on courses in Germany, contact: MAJ Tom Logan, HQ, USACHPPM-EUR, CMR 402, Box 137, APO AE 09180; Tel: 49-6371-86-8540/44, DSN: 486-8540/44. Classes are conducted at the USACHPPM-EUR, Landstuhl, Germany.

3. For Information on courses taught at the Environmental Training Center, contact: Ms. Gail Boeff, ATTN: ATZR-BT, Fort Sill, OK 73503-5100; Tel: (405) 351-2111, Fax: (405) 351-5722, DSN Prefix 639. The Environmental Training Center at Fort Sill, OK conducts a variety of environmental, natural resources and occupational health courses.

NAVY SPONSORED COURSES



1. For information on the following courses, contact: Mr. F. De Masi, NDVECC, Naval Air Station Jacksonville, Box 43, Jacksonville, FL 32212; Tel: (904) 772-2424, Fax: (904) 779-0107, DSN Prefix 942. Classes are conducted at the Disease Vector Ecology

and Control Center, NAS Jacksonville, Jacksonville, FL.

Medical Entomology and Pest Management Technology (B-322-1050):

3-14 JUN 96

8-19 JUL 96

Pesticide Applicator Training (Core) (B-322-1070),
Instruction for Initial Certification:
9-16 SEP 96

Plant Pest and Vegetation Management (B-322-1071),
Initial Certification for Categories 2, 3, 5 & 6:
17-20 SEP 96

Arthropod and Vertebrate Pest Management
(B-322-1072), Initial Certification for Categories 7 & 8:
18-28 MAR 96
23 SEP - 3 OCT 96

Recertification Course (B322-1074), Category 8:
16-18 APR 96
19-21 NOV 96

Operational Entomology Training (B-322-1077),
designed for A/D & Reserve PMTs, EHOs,
Entomologists, Epidemiologists & others assigned to
PM units:
6-17 MAY 96
21 OCT - 1 NOV 96

2. For information on the following courses, contact:
Dr. W.E. Tozer, NDVECC, Naval Air Station Alameda,
Building 130, Alameda, CA 94501-5039; Tel: (510)
263-2806, DSN Prefix 993. Classes are conducted at the
Disease Vector Ecology and Control Center, NAS
Alameda, Alameda, CA.

Medical Entomology and Pest Management Technology
for Preventive Medicine Technicians (B-322-0017):
18 MAR - 12 APR 96
22 JUL - 16 AUG 96

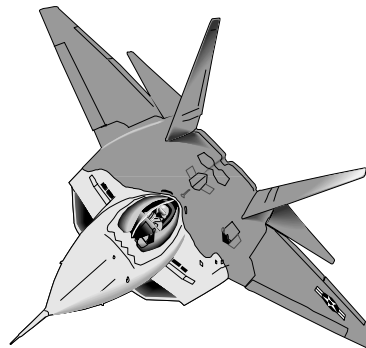
Medical Entomology and Pest Management Technology
(Reserve Training) (B-322-1050):
9-20 SEP 96 at Bangor, WA

Recertification Course (B-322-1074), Category 8:
23-26 APR 96 at NEPMU-5
3-6 SEP 96 at Bangor, WA

Shipboard Pest Management (B-322-1075):
NDVECC(A)
17 APR 96
10 JUL 96 at Bangor, WA
21 AUG 96 at Bangor, WA
25 SEP 96 at Bangor, WA

AIR FORCE SPONSORED COURSES

1. To enroll in courses held at Sheppard AFB, contact:
Programs Division, 2AF/DOP, Keesler AFB, MS



39534-5000; DSN:
597-1336. For
information on the
content of the following
courses, refer to
AFCAT 36-2223,
USAF Formal Schools
or contact: Mr. Hershell
Bland, 366 TS/TSIM
(Training
Squadron/Training
Squadron, Instructional
Mechanical), 727

Missile Road, Sheppard AFB, TX 76311-2254; DSN:
736-5811, DSN Fax: 736-3345. Classes are conducted
at Sheppard AFB, TX.

Pest Management Specialist (Certification),
#J3AZR3E453 003 (previously #J3AZR56650-003).
Initial Certification for Core, Categories 3,5,6,7 & 8:

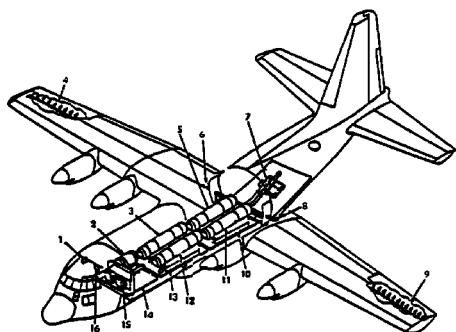
2. For information on the following course, contact:
Capt Duane L. Meighan, USAF School of Aerospace
Medicine/EH, Brooks AFB, TX 78235-5123 at Tel:
(210) 536-2058/59, DSN Prefix 240.

Operational Entomology Course (OEC) -
#B30ZY43M3-000 is a two week training course that
includes vector bionomics and vector-borne disease
profiles, surveillance and control of vectors and vector-
borne diseases, and information, intelligence, and
perspectives on developing country operations during
exercises, hostilities, and natural disasters. Academic
instruction, practical exercises and field experiences
simulate actual vector-borne disease surveillance and
control situations. The course is designed to provide
training for the following Air Force specialties and DoD
personnel: public health officers (43H1/3); public
health apprentices (4E031, E-2 and above with
completion of 5-level CDC and the recommendation of
your supervisor), journeymen (4E051), craftsmen
(4E071), or superintendents (4E091); medical
entomologists (43M1/3); flight surgeons (48A1/3 or
48P1/3); pest management apprentices (3E433, E-2 and
above with completion of 5-level CDC and the
recommendation of your supervisor), journeymen
(3E453), craftsmen (3E473), or superintendents (3E490
with a prior AFSC 3E433, 3E453, and 3E473), or
equivalent civilian pest management personnel; and
other military and civilian public health and pest
management personnel with the consent of the faculty.
Quotas are obtained through the Unit or MAJCOM
Training Managers. Army and Navy personnel may
contact USAFSAM/EH to request attendance in OEC
and are admitted as slots become available.

18-29 MAR 96
8-19 JUL 96
9 -20 SEP 96

3. For information on the following course, contact: Dr. Terry L. Biery, 757 AS/DOSE, YARS, Vienna, OH 44473-5000; Tel: (216) 392-1111/1178, DSN Prefix 346.

Aerial Application of Pesticides (Certification) - #AAP-001
10-14 JUN 96



CIVILIAN SPONSORED COURSES



The MacArthur Foundation sponsors a two-week summer course each year entitled "Biology of Disease Vectors." This unique course is offered at the Arthropod-borne and Infectious Diseases Laboratory of Colorado

State University. The course is designed to address the most important vector-borne disease issues, to help recruit scientists from other disciplines in the field of medical entomology, and to provide a common background, training, and conceptual framework for developing a new generation of vector-borne disease experts, who can apply modern molecular approaches to the study and control of parasite vectors. It would be especially useful for those who are new to the field of medical entomology and for those with conventional training in the vector-borne diseases. Estimated expenses include \$1,500 tuition, \$220-\$305 room (depending on single or double occupancy) and \$180 for on campus meals. This year's course is being held 16-28 June; unfortunately the deadline for application was 20 February 1996. This information is provided so that those who wish to attend can begin planning and budgeting for next year's iteration. Further information can be obtained by contacting Dr. Stephen Higgs, Arthropod-borne and Infectious Diseases Laboratory

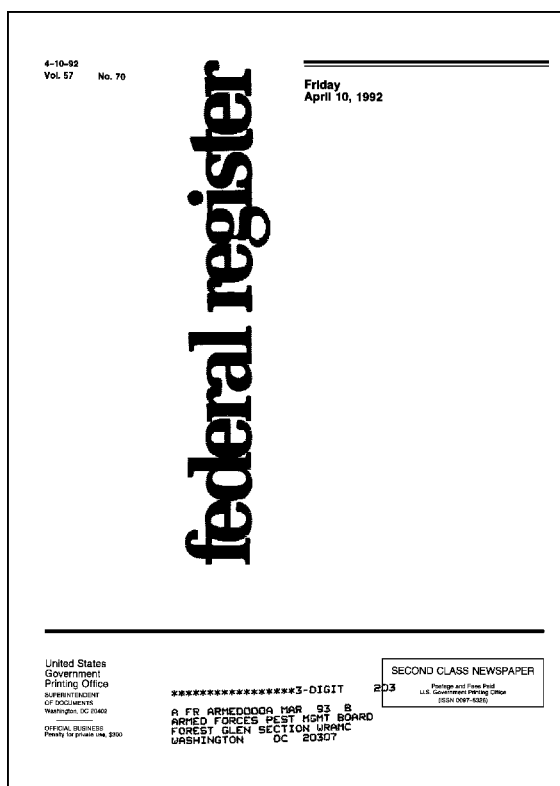
(AIDL), Foothills Campus, Colorado State University, Fort Collins, CO 80523-1682, Tel: (970) 491-8604, Fax: 8323, e-mail: shiggs@vines.colostate.edu

The University of Maryland at College Park sponsors an excellent course entitled "Advanced Turfgrass IPM Short Course." Principles of agronomy, weed science, entomology, and plant pathology are stressed and woven together to support each of the other disciplines, providing an excellent practical IPM approach to turfgrass management. Many publications and samples of grasses, weeds and insects are provided as class materials. This course is highly recommended for pest management program managers, land management specialists and golf course superintendents. Attending this course will help managers reduce reliance on pesticides and meet the DoD goal of 50% pesticide reduction by the year 2000.

The course is taught each January with a lecture-only option or a lecture-lab option. Estimated cost for each program is \$550 and \$650, respectively.

This information is provided so that those who wish to attend can begin planning and budgeting for next year's iteration. Further information can be obtained by contacting Dr. Lee Hellman, who can be reached at Tel: (301) 405-3920.

FEDERAL REGISTER



The following is compiled from the Federal Register (FR), which is a daily listing of rules, proposed rules, and notices generated by U.S. Government agencies. Executive Orders, proclamations, and other documents from the President are also in the FR. Our listings include FR items which may be of interest to the DoD pest management and natural resources communities; environmental impact statement listings and other DoD items unrelated to pest and natural resource management generally are not included.

VOL 60 (1-31 December 1995)

13-64070-73 Fish and Wildlife Service (FWS), Interior, National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA) - Action - Notice of Policy; Request for Public Comments Draft Policy for Conserving Species Listed or Proposed Listing Under the Endangered Species Act While Providing and Enhancing Recreational Fisheries Opportunities; Request for Public Comment.

14-64282-95 Environmental Protection Agency (EPA) - Action - Policy Statement - Worker Protection Standard; Labeling Revisions Required for Pesticide

Products Within the Scope of the Worker Protection Standard.

VOL 61 (1-31 January 1996)

2-35-47 Fish and Wildlife Service (FWS) - Action - Proposed Rule - Endangered and Threatened Wildlife and Plants (ETWP); Proposed Establishment of a Nonessential Experimental Population of California Condors in Northern Arizona.

24-1924-28 Environmental Protection Agency (EPA) - Action - Notice - Notice of Receipt of Requests to Voluntarily Cancel Certain Pesticide Registrations.

26-2391-93 Animal and Plant Health Inspection Service (APHIS) - Action - Interim Rule and Request for Comments - Mexican Fruit Fly Regulations; Addition of Regulated Areas.

26-2510-11 EPA - Action - Notice - Notice of Availability of Reregistration Eligibility Decision Documents; Opening of Public Comment Period.

31-3176-77 APHIS - Action - Affirmation of Interim Rules as Final Rule - Pine Shoot Beetle.

31-3369 FWS - Action - Reopening of the Comment Period for the Proposed Special Rule - ETWP; Proposed Special Rule for the Conservation of the Northern Spotted Owl on Non-Federal Lands.

31-3400-01 EPA - Action - Notice - Notice of Receipt of Requests for Amendments to Delete Uses in Certain Pesticide Registrations.

